

FRANCIS SEUFFERT

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Department of Mathematics

University of Pennsylvania

David Rittenhouse Lab.

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ACADEMIC APPOINTMENTS

1. *University of Pennsylvania*, Philadelphia, PA, 2017-Present

Vice Provost Postdoctoral Fellow

Adviser: Ryan Hynd

EDUCATION

1. *Rutgers University*, Piscataway, NJ, 2010-2016

PhD in Mathematics, 2016, Specialization: Functional Analysis and PDEs.

Thesis Adviser: Eric Carlen.

2. *Stony Brook University*, Stony Brook, NY, 2009-2010

3. *Princeton University*, Princeton, NJ, 2005-2009

B.A. in Mathematics

PUBLICATIONS

- R. Hynd and F. Seuffert, *Extremal Functions of the BMO Inequality*. In preparation.
- F. Seuffert, *Stability Estimates on \mathbb{S}^2 : the Onofri Inequality and the Log-HLS Inequality*. In preparation.
- R. Hynd and F. Seuffert, *Symmetrization Techniques for Morrey's Inequality*. Preprint.
- R. Hynd and F. Seuffert, *Asymptotic Flatness of Morrey Extremals*. arXiv: 1905.07060, 2019.
- R. Hynd and F. Seuffert, *Extremal Functions for Morrey's Inequality*. arXiv: 1810.04393, 2018. (submitted to *Advances in Mathematics*).
- F. Seuffert, *A Stability Result for a Family of Sharp Gagliardo-Nirenberg Inequalities*. arXiv:1610.06869, 2016.
- F. Seuffert, *An Extension of the Bianchi-Egnell Stability Estimate to Bakry, Gentil, and Ledoux's Generalization of the Sobolev Inequality to Continuous Dimensions*. *Journal of Functional Analysis*, **273**, Issue 10 (2017), 3094-3149.

RESEARCH EXPERIENCE

1. Mathematics Department, University of Pennsylvania

Vice Provost Postdoctoral Fellow 2017-Present

Mentor: Ryan Hynd

- Established existence and qualitative characteristics of extremals of Morrey's inequality
- Studied symmetrization methods and their application to analyzing inequalities and PDEs
- Analyzed elliptic p-Laplace equations

2. Mathematics Department, Rutgers University

Doctoral Research 2010-2016

Research Adviser: Eric Carlen

- Extended Bianchi-Egnell Stability Estimate of the Sobolev Inequality to cylindrically symmetric functions in continuous dimensions
- Established a stability estimate for a family of sharp Gagliardo-Nirenberg Inequalities
- Established Local Bianchi-Egnell type stability estimate for the Onofri Inequality
- Investigated application of stability estimates to nonlinear wave equations

3. Mathematics Department, Princeton University, Princeton NJ
Undergraduate Summer Research and Senior Thesis 2008-2009
Research Adviser: David Gabai

- Classified topological invariants of train tracks on twice-punctured torus

INVITED TALKS

- *Upcoming*: 13th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Atlanta, GA, June 2020.
- *Upcoming*: Mathematics Colloquium, St. John's University, November 2019.
- Geometry/Analysis Seminar, Columbia University, October 2019.
- Mathematical Colloquium, Linköping University, August 2019.
- Swedish Summer PDEs, KTH Royal Institute of Technology in Stockholm, August 2019.
- Analysis Seminar, The University of Hong Kong, February 2019.
- Geometry-Topology Seminar, University of Pennsylvania, February 2019.
- Fluid Mechanics and Waves Seminar, New Jersey Institute of Technology, April 2018.
- Analysis Seminar, The University of Hong Kong, February 2018.
- Analysis Seminar, University of Pennsylvania, September 2017.

RESEARCH INTERESTS

- Functional inequalities: approximating sharp constants and classifying extremals
- Use of calculus of variations in establishing stability estimates of sharp inequalities
- Elliptic p-Laplace equations
- Exploring the relationship between the Sobolev Inequality and other inequalities like the Gagliardo-Nirenberg inequalities
- Symmetrization methods and their applications to functional inequalities and PDEs

TEACHING EXPERIENCE

1. University of Pennsylvania, 2017-Present

Instructor

- Calculus I
- One section of approximately 130 students
- Responsible for lectures, writing homework, quizzes, exams, and office hours

2. Yu's Elite Education, 2014-2016

Teacher

- Taught elementary and middle school children in a variety of classes
- Fall 2016, taught six sections: Arithmetic and Geometry, two sections; 8th grade competition Math, two sections; Pre-Algebra, one section; and Algebra and Geometry, one section
- Classes taught prior to fall 2016: Arithmetic and Geometry; Pre-Algebra; Algebra and Geometry; 8th grade competition Math; and Introduction to Number Theory, Combinatorics, and Geometry
- Classes varied from five to fifteen students
- Wrote lesson plans; lectured; wrote and graded homework and exams; and communicated with parents

3. Rutgers University, 2010-2016

Teaching Assistant

- Calculus II for Mathematical and Physical Sciences
- Conducted three workshops (25 students each) a week; held office hours
- Wrote and graded quizzes and homework

Grader

- Advanced Calculus for Engineering
- Graded homework and exams

Grader

- Introduction to Mathematical Reasoning
- Graded homework

Teaching Assistant

- Calculus I
- Conducted three recitations (25 students each) a week; held office hours
- Wrote and graded quizzes

4. Bergen Community College, 2010-2013

Tutor

- Tutored one on one and conducted study groups
- Tutored all levels of Math from Pre-Algebra to Differential Equations
- Conducted study groups in Calculus and Statistics with between five and fifteen students
- Wrote qualifying exam for calculus tutors

5. SUNY Stony Brook, 2009-2010

Teaching Assistant

- Calculus B
- Conducted three recitations (25 students each) a week; held office hours

6. Mathnasium

Tutor

- Tutored one on one
- Tutored all levels of Math from Arithmetic to Algebra